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OCTOBER 4.

Mr. CHARLES MORRIS in the chair.

Twenty-eight persons present.

Papers under the following titles were presented for publication:—

“The Batrachia and Reptilia of North Western Texas,” by E. D. Cope.

“On a Collection of Batrachia and Reptilia from Washington and British Columbia,” by E. D. Cope.

“Notes on a Collection of Shells from the State of Tabasco, Mexico,” by Henry A. Pilsbry.

Geology of the Isles of Shoals.—Mr. THEODORE D. RAND remarked that Hitchcock, in his *Geology of New Hampshire*, devotes but a few lines to these islands, stating that their geology has been neglected.

They are evidently the remains of a single island eroded by the Atlantic Ocean and are composed of gneissoid rocks with a number of trap dykes.

The rock is chiefly a coarse orthoclase-muscovite gneiss, of which the orthoclase constitutes probably eighty per cent, the quartz less than twenty and the muscovite probably not over two per cent. Inter-stratified in this coarse gneiss is a fine-grained variety containing much more mica and usually of a dark gray color. In some places this contains serpentine veins of orthoclase, in this as well as in other respects resembling our Manayunk schists and gneisses. Garnets, while not entirely absent, are quite rare, and the rock very rarely approaches a schist. The strike is pretty uniform, about N. 70° E., while the dip varies, though usually 70° to 90° N. W. Through these rocks pass numerous joints, many of them very irregular. Along these joint-planes erosion has taken place leaving a very rough and irregular surface, the remaining rock being hard and not much disintegrated.

Crossing the islands in a general northeast and southwest direction are trap dykes of varying width, from one to ten feet. These form special lines of erosion, and are invariably lower than the adjacent gneiss, though apparently much harder. All exposed masses seem fresh and undecomposed.

Most remarkable among these is one at the southeast end of Star Island. It is about six feet across and extends at an acute angle from the south to the east shore. Its strike is N. 35° E., its dip 85° to 90° N. W., with two sets of joints, one parallel to the dip, the other nearly coincident with the stratification of the adjacent gneiss. At each end the dyke was deeply eroded and the adjacent gneiss in

great masses had fallen in, forming at one point one of the places of historical interest known as Betty Moody's Cave. The length of this dyke from shore to shore is probably five hundred feet, but of this about two hundred feet have been eroded to sea level. In the middle the trap is about ten feet below the gneiss walls; to the south it descends by a series of steps quite abruptly and between vertical walls of the gneiss probably fifty feet to the sea.

The present erosion continuing, this southeast end of the island will be cut off entirely and form a separate island of the group. At other points the same action may be seen.

Two phenomena were observed for which no easy explanation offers. The dark, fine-grained gneiss was usually rather regularly inter-stratified in the more abundant coarse granitoid gneiss, but at a number of points it was observed abutting upon the gneiss in the direction of the strike, but without the slightest evidence of a fault. At one point on Appledore Island there was a stratum of the dark variety, thirty feet wide; suddenly, and almost at a right angle, twenty feet of this were replaced by the coarse granitoid rock, while the remaining ten feet went on as before. A clue to the explanation was seen on Appledore, where a stratum of the fine-grained was separated from a larger mass of the same of darker color by a foot or two of the coarse feldspathic rock, which also bounded it on the further side. This stratum had, in about forty feet, five constrictions, narrowing it from three feet or more to hardly as many inches in one place.

The other feature was a form of erosion which he had never before seen. On the horizontal or slightly inclined surfaces of the nearly vertical, fine-grained gneiss were numerous holes, from the size of a small pea to that of a cherry. The gneiss was hard and undecomposed. These pits were roughly globular and were generally larger below than at the opening. They appeared to enlarge and coalesce, thus breaking down the rock, bearing a slight resemblance, on a very small scale, to the pot holes of a river bottom. These were high above the sea. They appeared somewhat as if a mineral, like garnet, had weathered out, but there are no such minerals in the rock, and the holes show no evidence of such; they are quite rough on the inside and hence have not been bored. Their position is such that only ocean spray and rain water could reach them. They are quite abundant.

On the Permanent and Temporary Dentitions of certain Three-toed Horses.—Professor COPE described the changes in the characters of the superior molars of *Protohippus placidus* Leidy, resulting from age and wear, and the characters of the dentition of colts of *Protohippus* and *Hippotherium*. He pointed out that in stages of wear up to middle life *P. placidus* is the *Hippotherium gratum* of Leidy, and that then the protocone fuses with the paracone, and the animal becomes a *Protohippus*. He had not observed this to take